

Space-Based Detection of Earth-Threatening Objects: Comparison of Visible and Infrared Systems

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Abstract

Space-based sensors to detect and track Earth-threatening objects have been proposed for operation in the visible and the infrared bands. We analyze the detectability in each of these wavelength bands of various types of objects (e.g. asteroids, active comets, dead comets) as a function of the object's distance from the Earth. We discuss candidate sensor systems in each band that would detect Earth-threatening objects at a sufficient distance to provide adequate time for warning of an Earth impact and response. The comparative advantages and disadvantages of each wavelength band are identified, with respect to each band's ultimate performance limits and its current technologically-limited performance. We discuss a possible prototype sensor space mission for deep-space object detection, tracking and classification.

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